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A CONTRIBUTION TO THE TAXONOMY OF THE GENUS ORGERIUS IN AMERICA, NORTH OF MEXICO (FULGORIDAE, HOMOPTERA)

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(continued from April issue)

Comparative Notes: This species resembles **spicatus** and **proprius** more closely than other species in the genus. These three species can be segregated into a third subgroup if the lateral lobe of the ninth abdominal segment alone is compared since in these species the lobe is distinctly pointed apically, while in the **rhyparus** or **minor** groups it is broadly rounded or truncate. In other characteristics they resemble the **rhyparus** group. The lobe itself in the three species is separated as follows: in **spicatus** the dorsal margin is straight, the apex very acute, and the ventral margin is concave; in **proprius** the dorsal margin is sinuate, broadly convex through middle, apex is likewise acute, and ventral margin slightly concave; in **triquestrus** the dorsal margin is convex, ventral margin straight, the apex less acute and whole lobe shorter than in the other two. **Spicatus** is separated from **triquestrus** and **proprius** by having a shorter vertex, which is extended beyond the eye a distance equal to half its length; in the two latter this distance is greater than half the length and separates these from true **rhyparus** group. **Triquestrus** is distinguished from **proprius** by its more obese body, the vertex more acutely pointed, the reticulation of the tegmina indefinite so that only the longitudinal veins are prominent.

Location of Types and Distribution: Holotype male and allotype female, collected by R. H. Beamer from Orange Co., California, on July 14, 1929. Three female and eight male paratypes same data. One male paratype same collector from Santa Ana County, California, collected on July 30, 1932. These types are in the Snow Entomological Collection at the University of Kansas.

Orgerius pajaronius Ball and Hartzell 1923

as **Orgerius rhyparus** var. **pajaronius** Ball, E. D. and Hartzell, Ann. Ento. Soc. Amer. XV, p. 145, 1923.

Original Description

"Small, rather slender, female not over 4 mm. in length, resembling **concordus** above but much smaller and with the face much more frequently transversely banded with light."

Described from two pairs from Salinas and Watsonville, California. This variety occurs on the Coast Range from the Salinas Valley north to San Francisco and a pair were taken on the eastern slope of the Sierra Nevadas near Le Grande, Oregon.

Author's Description

Size: Length of body from tip of head to tip of abdomen, male

4.2 mm. to 6.0 mm.; female 5.2 mm. to 5.7 mm. Greatest body width, male 2.7 mm. to 3.5 mm.; female 3.2 mm. to 3.5 mm.

Color: Variable in color from rufo-testaceous to much darker, both sexes heavily spotted. Upper surface marked much as in **concordus**, the tegmina with cells darkened, veins of reticulation yellow. Frons yellowish-tan with speckles forming five transverse bands, alternating with lighter bands where spots are few or absent. Post clypeus yellowish-orange at base, a dark brown spot on each side just before apex. Pronotal ventral flap with a conspicuous light yellow wedge on the inner half just back of middle so that it is in line with the lighter area of the postclypeus and forms a striking light band across the body at this point.

Color Variation: Two specimens, a male and a female of the **clitellus** coloration, namely, dark brown tegmina in contrast to a lighter body.

Structural Details: This is one of the smaller species in the genus with the females particularly smaller. Vertex shorter resembling **concordus**, extending beyond eye four-fifths the length of the eye itself, its greatest width appromimately eleven-sixteenths of its length and its lateral margins somewhat foliaceous but only slightly elevated. Frons short, about one-fifth longer than width of head across eyes. Tegmina slightly longer than wide, its posterior margin more transverse than in many species, reticulation prominent but longitudinal veins not distinct. Lateral lobe of ninth abdominal segment of the **rhyparus** type, with length and width equal, the dorsal margin faintly concave, a broadly rounded apex, the ventral margin shorter than the length of the harpago showing beyond the lobe.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed at base, then lateral margins running parallel a short distance so that the greatest width is just at base of stylus, apex again narrowed and the apical margin almost straight.

Harpago with basal portion narrowed, apex narrowly rounded and dorsal margin just back of middle extended into a short blunt hook, another external hook located anteriorly and ventrad to the first, its apex finely pointed and recurved.

Aedeagal structure large, its length slightly four times greater than its width. Base of aedeagus a rectangular plate with two short basal prongs and apically bearing two stout chitinous rods, each terminating in a membraneous piece, with the part outside the theca bulbous, then abruptly terminating in a sharply pointed apex. Caudad the theca on the ventral side ends in two lobed parts which meet on the inner margin just posterior to middle; on the dorsal side its length is two-thirds only of the ventral length and its margin is straight.

Comparative Notes: This was described by Ball and Hartzell as a variety of **rhyparus** being distinguished by its smaller, slender body and the face more frequently transversely banded with light. This color difference of the face does seem to be somewhat distinctive.

The species in this paper has been placed in the **rhyparus** group which indicates that it resembles rather closely **rhyparus, junceus, concordus, bucculentus, disgregus** and **bilobatus.** For a general discussion of the six species see notes under the description of **rhyparus.**

Within the group it more closely resembles **bucculentus** and **disgregus** and **bilobatus.** For comparison of the former and latter see the notes in the description of **bucculentus.** From **disgregus** it is differenciated by being smaller and more obese in shape, having a narrower vertex and with apex of anal flap of male narrowed and truncate. In **disgregus** the vertex is distinctly heart-shaped and apex of anal flap of male has square corners and posterior margin straight. The lateral lobe of the ninth abdominal segment of the male is longer in **disgregus** with the dorsal margin approximately twice the length of the ventral while in **pajaronius** the latter is about two-thirds of the former. The male genitalia are distinct for the two species.

Location of Types: The types are in the National Museum, Washington, D. C.

Distribution: Described from Salinas and Watsonville, California. A series of specimens were used for study taken at the following places in California: Santa Cruz Mts., Stinson Beach, Upper Lake and Monterey.

Orgerius bucculentus n. sp.

Size: Length of body from tip of head to tip of abdomen, male 4.8 mm. to 5.2 mm.; female 4.5 mm to 4.7 mm. Greatest body width male 2.7 mm. to 2.9 mm; female 2.9 mm to 3.2 mm.

Color: Uniform rufo-testaceous with body thickly spotted with contrasting brown dots. Vertex uniformly spotted, no pronounced clusters along margins. Frons with anterior two-thirds uniformly spotted, back of which is a lighter transverse band with few spots, followed by a broad dark band which adjoins the dark band across gena around antennae and conspicuous dark band on ventral flap of pronotum. Anterior half of postclypeus light in sharp contrast to dark posterior half, this light band together with a corresponding light area on the thorax makes a conspicuous band across the head. Tegmina more uniformly fuscous than in related species, frequently contastingly darkened as in Ball's **clitellus** varriety. Abdomen and legs heavily spotted.

Structural Details: A chubby, broad species with a short broad vertex. Vertex, length only slightly greater than width, extended in front of eye not quite two-thirds length of eye. Median length of pronotum about three-fourths median length of vertex. Frons shorter than in some species, its length about one-firth greater than width across eyes. Tegmina slightly broader than long, portion of abdomen exposed beyond tip of tegmen much longer. Reticulation less prominent, cells between larger, longitudinal veins more easily followed. Lateral lobe of ninth abdominal segment of male similar to **pajaronius** but differs by being somewhat shorter and broader across apex.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed at base, bulging at middle with greatest width at base of stylus, then abruptly narrowing to a broadly pointed apex.

Harpago with basal portion narrowed, apex narrowly rounded and dorsal margin just back of middle extended into a short blunt hook, another external hook located anteriorly and ventrad to the first, its apex finely pointed and recurved, both hooks smaller than in **pajaronius.**

The aedeagal base is a large rectangular plate, bilobed basally and bearing on its caudal margin two sclerotized rods, each of which terminates in the usual membranous, elbow-shaped arm, most of which in this species is covered by a lobe of the theca except for the extreme terminal bulbous portion which narrows abruptly at end into an extremely fine pointed hook. On the dorsal side the theca is shorter than on the ventral surface but on either side it forms two large lobes with a deep cleft between them.

Comparative Notes: This species falls in the **rhyparus** group which means that it may be confused with **rhyparus, concordus, pajaronius, disgregus** and **bilobatus.** For a general comparison of these species see notes under this heading in the description of **rhyparus.**

Within the group **bucculentus** is more similar to **pajaronius, bilobatus** and **disgregus.** The vertex is distinguishable in these four species as follows: apex acutely pointed and margins straight and elevated in **pajaronius** and **bucculentus,** rounded in **disgregus** and **bilobatus,** with margins scarcely elevated, somewhat outwardly curved in **bilobatus,** distinctly so in **disgregus;** width of vertex in **pajaronius** eleven-sixteenth of length, in **bilobatus** six-sevenths, in **disgregus** three-fourths of length and in **bucculentus** width only slightly less than length. The pronotum varies as follows: in **bilobatus** the anterior margin is deeply concave behind eyes, the lateral margin forms an acute angle with the front margin, the shoulder width is greater

than the width of the disk between the lateral carinae; in **pajaronius** and **disgregus** the anterior margin is moderately concave, the lateral angle not pronounced and the shoulder is approximately equal in width to the median disk; in **bucculentus** there is no pronounced concavity or angle behind eye but the shoulder is wider than the median disk as in **bilobatus.** The frons in **disgregus** is longer being one-fourth longer than greatest width across eyes while in the others it is only approximately one-fifth longer. The tegmina in **bucculentus** are slightly wider than long, in the other three just the opposite. In situ the tip of the anal flap in the male varies as follows: broad and truncate in **disgregus,** narrowed and straight in **pajaronius,** roundingly pointed in **bucculentus** and **bilobatus.** The lateral lobes of the ninth abdominal segments vary in length, longer with the dorsal margin a straight slope in **disgregus,** shortest with dorsal margin slightly concave near base in **bucculentus,** moderately long with dorsal margin slightly concave just back of apex in **pajaronius** and posterior margin bilobate in **bilobatus.** Distinct male genitalia occur in all the species as can be seen by an examination of the drawings.

Location of Types and Distribution: This species was described from the following specimens, collected by R. H. Beamer in Oregon, 1935; holotype male, one paratype male and female each, Criterion on July 2, allotype female, Kirby on July 15, one male paratype from Culver on July 2 and two male paratypes from Grant's Pass on July 12.

Orgerius bilobatus n. sp.

Size: Leugth from tip of head to tip of abdomen, male 4.5 mm. to 5.3 mm.; female 4.7 mm. to 5.5 mm. Greatest body width, male 2.7 mm. to 2.8 mm.; female 3.2 to 3.6 mm.

Color: Male uniformly rufo-testaceous with small, inconspicuous spots or darker with greenish tint and speckled. Female somewhat darker and more heavily speckled. Vertex faintly barred, due to speckles arranged more or less in bands, one across both base and apex and a median one offset at lateral margins by contrasting light spots in front and behind, a pair of light brown triangular depressed areas near base. Frons with scattered clusters of spots forming two or three broad bands. Postclypeus with lighter oblique bands, brown areas near tip. Anterior half of pronotum with large dots, forming a broad dark band, followed by a clear light bar, posterior margin again speckled. Rest of dorsal surface of body uniformly speckled, tegmina and abdomen somewhat mottled with fuscous. Legs stramineous, heavily speckled, tips of tibiae and tarsi dark brown.

Structural Details: Vertex short, triangular, apex more rounded

than in other species, its width at apex one-half to one-third of basal width, lateral margins slightly elevated, greatest width between eyes six-seventh of its length. Frons short, broadly rounded across apex. lateral carinae parallel, except at a point near the base where it converges slightly. Pronotum short, anterior margin deeply concave behind eye, the median disk between the arcuate lateral carinae subequal to side portion, the posterior margin shallowly emarginate, arched forward to a point posterior to mid-line. Tegmina rugulose, veins distinct resembling the **rhyparus** group more than the **minor** group. Lateral lobe of the ninth abdominal segment of male, abbreviated into a bilobate plate, its width twice as great as greatest length, its posterior margin slightly concave at middle, the length of the plate about three-fourths the length of anal flap and harpago exposed beyond its tip.

Male Genitalia: Anal flap narrowed at base, lateral margins parallel for most of the length, gradually converging to a rounded apex. Stylus elongate, slightly broadened at tip.

Harpago, as viewed from a flattened lateral view, ovate, the dorsal margin just back of middle extended into a slender, pointed hook, an external ventrad directed hook located anterior to middle.

The basal plate of the aedeagus is rectangular, deeply notched at middle of anterior margin, apically bearing two slender sclerotized rods which extend caudad as far as apical dorsal margin of theca, then bend at right angles whence they taper to a pointed apex. Both ventral and dorsal margins of the theca are deeply bilobed the dorsal lobes a trifle shorter than the ventral ones.

Comparative Notes: This species resembles the following species: **bucculentus, pajaronius** and **disgregus.** It is easily distinguished by the more bluntly rounded vertex, the bilobate plate-like extension of the ninth abdominal segment in the male, and the deep concavity of the anterior margin of the pronotum behind the eye.

For a more detailed comparison with the above species see comparative notes in description of **bucculentus.**

Location of Types: Described from male holotype and female allotype collected from Mt. Diablo, California, on July 16, 1933 by R. H. Beamer. Seven female paratypes and fourteen male paratypes same data. These types are in the Snow Entomological Collection, University of Kansas.

Orgerius junceus n. sp.

Size: Length from tip of head to tip of abdomen, male 5.0 mm. to 5.2 mm.; female 5.3 mm. to 5.5 mm. Greatest body width, male 2.75 mm.; female 3.0 mm. to 3.2 mm.

Color: Mottled dark and light yellow with small inconspicuous

darker spots. A few females somewhat lighter, and more rufous with spots more evenly distributed other females darker Lateral carinae of vertex outlined with clusters of small dark spots, toward tip arranged in one or two bands. Median tablet of frons yellow or tan, anterior to middle the median carina speckled and five clusters of spots bordering each lateral carinae, just back of middle a yellow transverse band without speckles, followed by a narrower darker band, densely speckled; lateral compartment of frons darker around the antennae, yellow at each end. Postclypeus light orange at base with faintly oblique lines densely speckled at tip. Anteclypeus lemon yellow with two conspicuous speckled areas. Pronotum with lateral carinae and central carinae arcs black bordered with wedge-shaped dark spots. Mesonotum yellowish-tan, uniformly but sparcely speckled, carinae dark. Tegmina and abdomen uniformly punctate, mottled irregularly with dark brown to black spots.

Structural Details: A small ovate, slender species with vertex longer than in **rhyparus.** Vertex narrow, extending beyond eye one-half its length or a trifle longer; its greatest length subequal or slightly greater than twice its width, its lateral margins less foliaceous and elevated than in **rhyparus.** Frons moderately long, only about one-fourth longer than greatest width across eyes. Tegmina longer than wide, its length two-fifteenths longer than width, the longitudinal veins slightly thicker than the reticulation. Lateral lobe of the ninth abdominal segment of male, width greater than length, broader across apex and less pointed than **rhyparus,** its ventral length about equal to length of harpago, showing beyond the lobes.

Male Genitalia: Anal flap (tenth abdominal segment) slender at base; its lateral margins diverging to a point one-fourth of its length and running parallel for three-fourths of its length, then converging to form a sharp arc at tip. Stylus long, slender and finger-like.

Harpago with basal portion bluntly truncate, apex rounded and middle of dorsal margin extended into a sharply pointed, cephalad directed hook, another lateral external hook located anterior and ventrad to first, the apex of which is directed cephalo-ventrad.

Base of aedeagus forming a U-shaped sclerotized plate which supports two slender, chitinized rods running caudad to almost the full length of theca, the apical portion of each rod beyond the thecal margin recurved, membranous at base, bulbous, then forming a chitinized triangular apex bearing a strong hook. On the ventral side of the theca, the apical margin ends in three lobes on each side, the inner one extending beyond the other two. On the dorsal side the theca forms two lobes of equal size, the curved portion of which is

just below the curved membranous portion of the aedeagus and extends up to less than one-half the distance from the apex.

Comparative Notes. This species belongs in the **rhyparus** group which means that it may be confused with **rhyparus, concordus, pajaronius, bucculentus, disgregus and bilobatus.** For a general comparison of these species see notes under that heading in the description of **rhyparus.**

Within the group **junceus** more closely resembles **rhyparus** and **concordus.** It is separated from either by its longer vertex which in length is over twice its width while in **rhyparus** this width is five-eighths of the length and in **concordus** seven-tenths. The length of the body is shorter in **junceus** and the lateral lobe of the ninth segment is more broadly lobulate than in the other two. Distinct male genitalia occur for all species, the differences of each being more recognized by an examination of the drawings.

Distribution and Location of Types: Male holotype, three female and five male paratypes collected by R. H. Beamer from Arroyo Seco River, California, August 8, 1938. Female allotype, three male and three female paratypes, same collector from Lockwood, California on July 24, 1935.

Orgerius concordus Ball and Hartzell 1922

Orgerius rhyparus var. concordus, Ball and Hartzell, Ann. Ent. Soc. Amer. XV: 144, 1922

Original Description

"Large obese form with the females averaging 5-6 mm., uniform dull fucous above, with a slightly pearl-gray sheen."

Described from two pairs from Cabazon, California, and Ti Juana, Mexico. This is the common variety in southern California extending from Visalia and Cabazon south and west to Ti Juana, Mexico.

Author's Description

Size: Length from tip of head to tip of abdomen, male 6.0 mm. to 6.3 mm.; female 6 mm. to 7 mm. Greatest body width, male 3 mm. to 3.5 mm.; female 4 mm. to 4.5 mm.

Color: A uniformly colored species with the general background yellowish-tan, varying to a gray-green, evenly speckled with brown. Occasional specimens are found with elytra dark brown or black in sharp contrast to the rest of the body. Lateral margins of vertex outlined with five clusters of brownish-black spots, separated by equal sized bare areas. Tegmina with cells between reticulations either solidly black or else heavily stippled on each side of the veins. Rest of dorsal surface heavily speckled with uniform round blackish-brown spots. Ventral part of body colored much as in **rhyparus** ex-

cept that the speckles are more numerous and conspicuous.

Structural Details: This is the largest species in the genus. Vertex moderately long, extending beyond eye one-half of its length, its greatest width approximately seven-tenths of its length and its lateral margins only slightly elevated. Frons elongate, approximately one-third longer than greatest width of head. Tegmina with length and width subequal although length a mere trifle greater, reticulation prominent, longitudinal veins not distinct. Lateral lobe of ninth abdominal segment, length slightly greater than width, its dorsal margin sloping in an oblique straight line to the broadly rounded apex, the ventral margin less than one-half the length of the dorsal margin and equal to the length of the harpago, showing beyond the lobe.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed at base, lateral margins gradually diverging so that greatest width is at apex, the apical margin itself straight. Stylus showing only the knobbed tip beyond dorsal margin of the flap.

Harpago with basal portion narrowed, apex rounded and dorsal margin at middle extended into a short blunt, cephalad-directed hook; another external hook located anteriorly and ventrad to the first, its apex recurved like a shepherd's crook.

Base of aedeagus forming a U-shaped sclerotized plate, the arms of U curled inward and two slender, chitinized rods attached to its base. Dorsad the basal half of each rod is covered by the bilobed theca, the latter dividing into two equal lobes by a cleft running over half the length. The exposed part of each aedeagal rod runs caudad a short distance, then bends at a right angle like an elbow. The transverse portion of the arm is membranous with irregular fluted margins, then at the tip the structure ends in a sharply pointed chitinized cap.

Comparative Notes: This species is apt to be confused with **rhyparus, bucculentus, junceus** and **disgregus.** For comparison with these species see notes under the description of **rhyparus.**

Within the group **concordus** is more readily confused with **rhyparus** and **junceus.** It differs from **rhyparus** mainly in having a longer vertex extended in front of eye a greater distance than length of eye while in **rhyparus** the vertex is heart-shaped and extended in front of eye a distance equal to or a little less than eye. Proportionally the body of **rhyparus** is more obese than that of **concordus.** The lateral lobe of the ninth abdominal segment is shorter and slightly more angulate than in **concordus.** For differences between **concordus** and **junceus** see notes under the description of that species.

Location of Types. Dr. Ball's types are in the National Museum, Washington, D. C. The type localities are Cabazon, California and Ti Juana, Mexico.

Distribution: Dr. Ball stated that this is the common variety in southern California. Specimens were at hand for study from the following places in California: San Jacinto Mountains, Mint Canyon, Mountain Springs, Three Rivers, San Diego County, Jacumba, Anza, Miramar and Tehachapi.

Orgerius spicatus n. sp.

Size: Length of body from tip of head to tip of abdomen, male, 5.0 mm. to 6.0 mm.; female 5.0 mm. to 5.5 mm. Greatest body width male 3.0 mm. to 3.6 mm.; female 3.0 mm. to 3.5 mm.

Color: Uniformly testaceous with slightly a reddish or sometimes greenish caste, speckled with fine dark dots. Vertex with lateral margins outlined with clusters of speckles, disk also conspicuously speckled. Shoulder carinae of pronotum outlined with about seven large black dots alternating with lighter clear areas, disk minutely speckled. Frons variable, some specimens yellowish-tan across central disk with a few minute dots, lateral margins outlined in black bordered with dark brown speckles, some with entire frons more heavily speckled. Postclypeus with basal two-thirds light, tip heavily mottled with dark blotches, dark brown speckles over all. Anteclypeus mottled with dark. Ventral pronotal flap uniformly speckled on anterior half, a swall light arc just back of middle, fewer spots posteriorly. Tegmina with cells fuscous, those along posterior margin dark brown, veins lighter, margined with dark brown. Abdomen testaceous, mottled with fuscous, and heavily speckled.

Structural Details: A variable species in size, the difference in females amounting to one-half a millimeter, in males as much as one millimeter. Vertex triangular, its width about five-eighths of its length, the portion extended beyond the eye, about four-fifths of the length of the eye, the lateral margins moderately foliaceous and elevated. Frons shorter than in some species, about one-fourth longer than width of head across eyes. Tegmina with length and width subequal, a few longitudinal veins distinct, reticulation less prominent than in **rhyparus** group. Lateral plate of ninth abdominal segment of male almost a true triangle, length and width subequal, its dorsal margin a straight line, terminating in a short arc, the ventral margin slightly concave, anal flap and harpago extended only a short distance beyond apex of the lobe.

Male Genitalia: Anal flap (tenth abdominal segment) parallel-margined for almost two-thirds its length, lateral margins converging abruptly at base of apical third, apex rounded.

Harpago, as viewed from a flattened lateral view, distinct in shape, its ventral margin smoothly rounded, the dorsal margin arcuate at apical third, then gradually diverging to form a sharply pointed hook at apex of basal third, then converging to a narow base, a second external recurved hook between the dorsal hook and base.

The aedeagus is composed of a basal sclerotized plate, the base of which is U-shaped while the apex bears two long sclerotized rods, which next end caudad. These rods are covered for most of their length by the theca, beyond the posterior margin of which they become membranous, make a sharp bend and finally at extreme apex form a slender chitinized spine. On the dorsal side thecal margin is truncate, on the ventral side it is four-lobed, the two outer lobes about twice the length of the middle ones and extending beyond the aedeagal arms a short distance.

Comparative Notes: **Spicatus** has a more distinct lobe on the ninth abdominal segment of the male than any other species. It is elongate and sharply pointed as to be described stiletto-like. This along with its extended vertex immediately separates it from the **minor group.**

If the ninth segment lobe is considered **spicatus** is more similar to **proprius** and **triquestrus.** For comparison of these three species see notes under description of **triquestrus.**

On the basis of the vertex and other characteristics it more closely resembles **rhyparus** and **disgregus.** From **rhyparus** it is distinguished by its broader vertex with tip less narrowed so that the width across apex is only one-third of the basal width while in the latter the apex width is one-fourth of the base. From **disgregus** it is separated by having a longer vertex. with lateral margins somewhat constricted before apex and tegmina with faint reticulation but strong longitudinal veins while in **disgregus** the vertex is broad, lateral margins are outwardly rounded and the reticulation is stronger.

Location of Types and Distribution: Described from male holotype and female allotype, collected by R. H. Beamer and L. W. Hepner from Topango Canyon, California, on August 5, 1938. Paratypes collected in the following places in California by R. H. Beamer, four males, Monrovia, July 27, 1935; two males and one female, Ventura, July 20, 1933; two males and two females, Santa Maria, July 19, 1933; one male and two females, Claremont, July 29, 1935; one male and one female, Beaumont, July 26, 1933. These types are in the Snow Entomological Collection at the University of Kansas.

Orgerius disgregus n. sp.

Author's Description

Size: Length of body from tip of head to tip of abdomen, male

5.5 mm. to 5.7 mm.; female 5.3 mm. to 5.5 mm. Greatest body width; male 3.1 mm. to 3.4 mm.; female 3.3 mm. to 3.5 mm.

Color: Varying from golden testaceous to deep fuscous both sexes heavily spotted. Lateral margins of vertex black bordered with three clusters of blackish dots. other spots lighter brown. Frons and clypeus with much the same markings as **concordus.** A semi-rectangular light spot on ventral pronotal flap present but not as conspicuous as in **pajaronius.** Tegmina with cells between reticulations margined in brownish-black. Rest of dorsal surface heavily speckled with uniform round blackish-brown spots. Under surface the same.

Structural Details: An obese species with heart-shaped vertex. Vertex broad, its width three-fourths of its length, its length in front of eye about two-thirds the length of the eye itself, its median length twice the median length of pronotum and its lateral margins not foliaceous, only slightly elevated. Frons elongate, approximately one-fourth longer than greatest width of head across eyes. Tegmina with length and width subequal, portion of abdomen exposed beyond tip of tegmina equal to length of latter. Reticulation prominent, longitudinal veins indicated at base but not prominent. Lateral lobe of ninth abdominal segment of male similar to **rhyparus** but more conspicuously lobulate. Its length and width equal, the dorsal margin obliquely sloping to the broadly rounded apex, the ventral margin over half the length of the dorsal but shorter than the length of the harpago exposed beyond its tip.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed at base, lateral margins outwardly curved so that greatest width is just posterior to tip of stylus, apex again narrowed and the apical margin straight.

Harpago ovate, dorsal and ventral margins uniformly rounded, middle of dorsal margin prolongated into a recurved hook, anterior to it an external hook which has a finely pointed recurved apex.

Basal plate of aedeagus a small bilobed plate from which running caudad are two stout chitinous rods each becoming membranous and forming a bulbous structure after which it tapers to a sharp point. On its ventral surface the theca terminates caudad in a bilobed portion, each lobe being subdivided into two lobes, a median large and outer smaller one. On the dorsal surface the theca is bilobed. the cleft in this case extending basally one-third of the length of the theca from the apical margin.

Comparative Notes: This species falls in the **rhyparus** group of species and therefore may be confused with **rhyparus, junceus, concordus, bucculentus, pajaronius** and **bilobatus.** For a general com-

parison of these species see notes under this heading in the description of **rhyparus.**

Within the group it is more easily confused with **pajaronius** and **bucculentus.** For a comparison with these two species see the notes in the description of these species.

Location of Types and Distribution Notes: Described from male holotype and female allotype, collected by R. H. Beamer from Orange County, California, on July 14, 1929. Two male and five female paratypes same data. These types are in the Snow Entomological Collection, University of Kansas.

Orgerius bicornis n. sp.

Size: Length of body from tip of head to tip of abdomen, male 4.4 mm. to 4.5 mm.; female 4.5 mm. Greatest body width, male 2.7 mm. to 3.0 mm.; female 3.0 mm. to 3.2 mm.

Color: Stramineous with faint markings of rust brown. Vertex with outer margins dark brown, faintly mottled across disk with rust brown. Eyes stramineous spotted in brown. Under side of body stramineous. Frons with a faint lighter yellow transverse band just before apex, rest of disk and genae lightly stippled in faint brown. Postclypeus yellow, lightly mottled in red brown toward apex. Anterior half of pronotal flap darkened, uniformly speckled with small reddish-brown spots. Mesonotum slightly greenish through middle, small brown speckles on lateral disks, a pair of round spots midway of length and apex reddish-brown. Tegmina tan with veins outlined on each side with brown, giving the appearance to the tegmina of being mottled. Abdomen uniformly stramineous, speckled with minute indistinct reddish-brown spots. Legs stramineous, speckled in light reddish-brown. Tarsi of all legs dark brown.

Structural Details: A small, moderately obese species with short triangular vertex. Vertex extende,d in front of eye a distance about three-fourths of distance behind anterior margin of eye, width across apex slightly less than one-third of basal width, greatest width about four-fifths of length, lateral margins markedly foliaceous, dilated mesad of eye into almost a horn-like expansion. Frons shorter than in many species, lateral length equal to length of clypeus, broadest just posterior to eyes, its anterior margin truncate. Postclypeus inflated. Pronotum short, the lateral shoulders shorter than in **rhyparus,** the median disk between the arcuate lateral carinae wider than the side portion, the posterior margin shallowly emarginate, extending forward to a depth of about one-third the pronotal length. The pits of the pronotum larger in diameter but less in numbers on each lateral disk numbering about seventeen or eighteen. Tegmina rugulose, the longitudinal veins not easily traceable. Abdominal

segments each with a prominent median carina and two lateral carinae. Lateral lobe of the ninth abdominal segment of male abbreviated into a broad plate instead of a lobe, its width a little over twice its length at the ventral side, the posterior margin deeply concave, the portion of the harpago, showing beyond tip of plate about one-half again as long as the length of the latter.

Male Genitalia: Anal flap (tenth abdominal segment) narrowed at base, its lateral margins diverging until greatest width is through median third, beyond this point gradually narrowing again to a rounded apex.

Harpago, as viewed from a flattened lateral view, ovate, with the dorsal margin extended into a broad, cephalad-curving hook at base of apical third, just cephalad of which is another external hook which curves downward and slightly cephalad.

The basal plate of the aedeagus is rectangular, deeply notched at middle of anterior margin, constricted midway on each lateral margin and apically bears two slender sclerotized rods which bend at right angles just beyond dorsal margin of the theca. The basal part of exposed arm is membranous, slightly bulbous, the apical part is chitinized and ends in a sharp point. Both ventral and dorsal margins of the theca are deeply bilobed, the dorsal lobes a trifle shorter and smaller than the ventral lobes.

Comparative Notes: **Bicornis** falls in the **minor** group due to the fact that the lobe of the ninth segment in male is plate-like, being much broader than long, the pronotal shoulders are shorter and narrower, and the hind tibiae are not foliaceous at base. The species in the **minor** group include, **ventosus, minor,** and **foliatus.** The four species are distinguished as follows: vertex broader, margins extremely foliaceous, forming two horns mesad of eye in **bicornis,** tip more rounded margins straight, less elevated in **ventosus** and **minor** lateral margins distinctly foliaceous, constricted before apex, apex narrowed in **foliatus.** The vertex in **minor,** although similar in shape is shorter than in **ventosus;** the coloring of the four species is somewhat different although the males in all tend to be uniform light yellowish-tan, **ventosus** and **minor** are mottled species with conspicuous darker spots at the sides of the abdominal segments near the apex; the frons of **bicornis** is proportionally wider and more truncate at anterior margin between eyes than in other species; the lateral lobe of the ninth abdominal segment of the male varies, in **bicornis** having a deeply concave posterior margin, in **foliatus** a straight, sloping one, in **ventosus** a shallowly concave one and in **minor** straight until just before apex where it is concave. The

male genitalia vary for the four species as can be seen in the drawings.

Location of Types and Distribution: Described from male holotype and female allotype, collected at Glenwood, Utah, on August 12, 1936, by R. H. Beamer. Thirteen paratype females and eleven paratype males same data. One male and four female paratypes taken at Elsinore, Utah, August 12, 1936. and one male paratype, Soldier Summit, Utah, on August 13, 1936, same collector.

Orgerius foliatus n. sp.

Size: Length of body from tip of head to tip of abdomen, male, 4.2 mm. to 4.5 mm.; female 4.2 mm. to 4.6 mm. Greatest body width, male 2.5 mm. to 2.7 mm.; female 2.7 mm. to 2.9 mm.

Color: Male, uniform stramineous or slightly darker with small brown specks and spots. Female darker and more heavily spotted. Lateral margins of vertex thinly outlined in brown, bordered by three clusters of brown spots and a pair of light brown triangular depressed areas near base. Head and thorax region from below light yellow, conspicuously barred as follows: a broad dark fuscous band, uniformly speckled with brown flecks extending across apical fourth of frons, surrounding antennae on the gena, and continuing across middle of pronotal flap, a second but fainter dark band across frons between eyes, a third narrow band across apex of postclypeus and adjacent coxae of front legs. Pronotum stramineous, only faintly darker on carinae and margins in some specimens, in others larger brown spots bordering the margins. Rest of dorsal surface sparsely stippled with brown. Tegmina uniform stramineous or slightly mottled by having cells bordered with small brown spots. Legs yellow, variously mottled with light reddish-brown spots of varying sizes.

Structural Details: A small, slender species of the **minor** group in that the lateral lobe of male ninth segment is much wider than long. Vertex acutely pointed at apex extended beyond eye a distance equal to half its length, its greatest width about three-fifths of its length, lateral margins distinctly foliaceous and elevated, especially from side view. Frons short but anteriorly narrowed, forming a conical apex. Pronotum short, the lateral shoulders shorter as in **minor**, the median disk between the arcuate lateral carinae only slightly wider or equal to side portion, the posterior margin shallowly emarginate arched forward to a point posterior to mid-line. Tegmina rugulose, the longitudinal veins more distinct than in **minor**, rest of reticulation less pronounced than in the **rhyparus** group. Abdominal segments carinate as in **minor** but inner carina less distinct. Lateral lobe of the ninth abdominal segment of male abbreviated into a broad triangular plate, its width three times its length at the ven-

tral side, the posterior and ventral margins almost meeting at a right angle, the portion of both the anal flap and harpago showing beyond this angle twice the length of the margin.

Male Genitalia: Anal flap (tenth abdominal segment) constricted at base, the lateral margins broadly arcuated, the apex smoothly rounded. Stylus finger-like but broad and short.

Harpago, as viewed from a flattened lateral view somewhat ovate, the dorsal margin extended just back of middle into an acutely pointed hook, an external ventrad-directed hook located at about the mid-line.

Base of aedeagus wedge-shaped, posteriorly bearing two slender sclerotized rods which are recurved just beyond dorsal margin of the theca. These rods are shorter than in **minor**, but the basal part of their exposed arm is membranous, slightly bulbous, followed by the sclerotized finely pointed apical region just as in **minor**. On the dorsal side the theca is half as long as on the ventral side, the posterior margin is extended into two slender lobes, separated by a rectangular cleft. Ventrad the theca ends in two lobes whose frilled margins meet about two-thirds the distance from the base.

Comparative Notes: Foliatus falls in the **minor** group due to the fact that the lobe of the ninth segment in the male is plate-like, being much broader than long, the pronotal shoulders are shorter and narrower than the median disk and the hind tibiae are not foliaceous at base.

The species is characterized by the very long vertex with distinctly foliaceous, elevated lateral margins which constrict before apex, making the width across apex conspicuously narrow, a broad frons with the anterior margin more truncate and characteristic male genitalia.

It more closely resembles **bicornis, minor** and **ventosus.** For further details of comparison see the notes in the description of **bicornis.**

Location of Types and Distribution: Described from male holotype and female allotype, collected by R. H. Beamer on June 30, 1932 from Alamagordo, New Mexico. Twenty male paratypes and twelve female paratypes same data. Eleven female and twenty-one male paratypes from White Sands, New Mexico, Collected by R. H. Beamer, June 27, 1940.

Orgerius ventosus Ball and Hartzell 1922

Ball, E. D. and Hartzell, A. Ann. Ent. Soc. Amer. 15, page 145, 1922, as **Orgerius rhyparus var. ventosus.**

Original Description

"Resembling **pajoronius** in size and form, dimorphic, in color, the female mottled fuscous and white, the central tablet of pronotum and scutellum almost creamy, the face trifaciate with light. Male clear yellowish-white with a few fuscous spots on the lateral carinae of the vertex.

"Described from three pairs from Mojava, California, taken July 30. This peculiar form appears to be strictly confined to the sparce vegetation of that windy and inhospitable desert region. Most of the specimens were beaten from a low spiny white shrub.

Author's Description

Size: From tip of head to tip of abdomen, male 4.0 mm.; female 4.2 mm. to 4.7 mm.; Greatest body width, male 2.4 mm. to 2.6 mm.; female .5 mm. to 2.7 mm.

Color: A dimorphic species, male uniform pale yellow with a few dark spots; female general color a dark tan, irregularly spotted. Male marked as follows: Vertex with faint reddish-brown spots sometimes present, concentrated at tip, a few along lateral margins, a pair of depressed darker areas near base; frons with two faint darker bands of speckles indicated at apex and just in front of middle, lateral compartments sparsely speckled with minute red spots; clypeus with oblique streaks of dark on central disk; ventral pronotal flap darkened and slightly speckled on anterior half, posterior half light. Tegmina cream colored, semi-transparent. Abdomen light yellow the minute lateral pores dark brown and one larger dark brown spot in each segment along each lateral border. Female marked as follows: from below speckles same location as in male but greatly intensified; vertex with a median transverse band of speckles in addition to apical and lateral ones. Pronotum with pits centered with red-brown and surrounded with fuscous. Mesonotum lightly speckled across disks, conspicuous darker areas of brown spots concentrated in extreme lateral corners, a pair of round brown spots just back of middle and one at extreme apex. Tegmina cream-colored to gray, veins cream, outlined on both sides with brown; abdominal segments from above conspicuously mottled due to concentration of the brown speckles into clusters, and conspicuous lateral brown spots on lateral margins which are larger than in male and a few large brownish-black spots extending almost completely across the last few segments.

Structural Details: Vertex broadly triangular, extended in front of eye a distance equal to half its length, its width two-thirds of its length, tip moderately pointed, at this point about one-fourth of its basal width, lateral margins moderately elevated. Frons narrower

than in **bicornis**, its anterior margin truncate. Pronotum size and shape of **minor**, the lateral shoulders shorter than in **rhyparus**, the median disk between the arcuate lateral carinae wider than the side portion, the posterior margin shallowly emarginate. Pits of pronotum smaller, brown centered so that they are easily distinguished, about eighteen or nineteen in each lateral portion. Tegmina semi-transparent, scarcely any reticulation between longitudinal veins distinguishable in the male, somewhat more prominent in female. Lateral lobe of ninth abdominal segment of male abbreviated into a very short broad plate, whose width is about four times its greatest length, its posterior margin shallowly concave and with the harpago exposed beyond its tip, a distance about twice its ventral length.

Male Genitalia: Anal flap broad at base, side slightly divergng to a distance of three-fourths of length then converging to end in a rounding tip. Stylus bell-shaped.

Harpago, as viewed from a flattened lateral view, ovate, with the dorsal margin extended into a broad, cephalad-curving hook at base of apical third, just cephalad of which is another external hook which curves downward and slightly cephalad.

Base of aedeagus wedge-shaped, its anterior margin deeply split and its posterior margin bearing two slender sclerotized rods which are recurved just before the truncate dorsal margin of the theca. The rods are short as in **foliatus**. The basal part of the curved portion is membranous, the apical part forms a slender sclerotized pointed hook. On the ventral side the theca forms two long slender lobes which extend some distance beyond the tip of the dorsal margin.

Comparative Notes: In the original description of this variety Ball placed it as a variety of **rhyparus**, distinguishing it on smaller size and color, namely the trifasciate face and pronotum and scutellum being almost creamy.

In structural details **ventosus** resembles **minor** rather than **rhyparus** in that the lobe of the ninth segment in the male is plate-like being much broader than long, the pronotal shoulders are shorter and narrower and the hind tibiae are not foliaecous at base. It also resembles other species in the **minor** group which are **bicornis** and **foliatus**. For a comparison with these species see notes in the description of **bicornis**.

Location of Types: In the National Museum, Washington, D. C.

Distribution: Described from Mojave, California. Studies were made for this paper from a long series from the type locality and in addition a long series from Palmdale, Yucca Grove, and Cuyama Grove and Las Vegas, Nevada.

Orgerius minor Ball, 1909

Ball, E. D. Proc. Bio. Soc. Wash. XXIII, page 202, 1909.

Original Description

"Resembling **rhyparus** but smaller, paler, with shorter, blunter vertex. Pale straw or slightly smoky. Length 4.5 mm.

Vertex triangular, broad at base, much broader than in **rhyparus** and scarcely as long, less than twice as long as its basal width, the apex acute, lateral carinae elevated. Front broad, the median tablet narrow and elevated. As seen from the side, the front is straight and meets the vertex in an acute angle with the apex a trifle rounding. Elytra as in **rhyparus**. Anal tube of male short, the lower part produced into a pointed tip covering the plates. Plates narrow, strap-shaped, scarcely or not at all inflated. Described from twelve specimens from Colorado and Utah collected by the author."

Author's Description

Size: Length from tip of head to tip of abdomen, male 5.1 mm. to 5.3 mm; female 4.7 mm. to 5.2 mm. Greatest body width, male 2.5 mm.; female 2.5 mm. to 2.7 mm.

Color: A dimorphic species but less so than in **ventosus**. Male uniform pale greenish-yellow with faint reddish-brown speckling; females with markings more pronounced. Vertex of male faintly stippled, thin lateral margins brown, two light brownish areas near base. Rest of dorsum including tegmina, uniform cream yellow with faint stippling of reddish-brown flecks. Vertex of female with three indefinite transverse bands of speckles, depressed dark areas larger, thorax mottled with dark, tegmina with veins margined in dark, abdomen heavily mottled, with speckles arranged in clusters, a large brown spot in posterior outer corner of each notum, other large dark spots on posterior segments. Undersurface of male head and thorax, cream colored, the usual transverse bands faintly stippled; females slightly darker. Legs pale, faintly mottled and stippled with reddish-brown.

Structural Details: Vertex broadly triangular, extended in front of eye a distance equal to a distance equal to half its length, its greatest width five-eighths of its length, moderately pointed at apex, lateral margins moderately elevated. Frons somewhat narrowed anteriorly between eyes, slightly inflated behind. Pronotum shorter than in the **rhyparus** group, the lateral shoulders abbreviated, their width not as great as width of median disk between the lateral carinae, posterior margin emarginate to a depth of less than one-half pro-

notal length. Pits of pronotum seemingly smaller than in some species, numbering about sixteen to seventeen. Tegmina with a reticulation moderately heavy, longitudinal veins not readily distinguishable. Lateral lobe of ninth abdominal segment of male abbreviated into a shore broad plate, whose width is about twice its greatest length, its posterior margin a straight slope until just its rounded apex where it is is slightly constricted, the portion of the harpago exposed beyond its tip about twice its ventral length.

Male Genittalia: Anal flap (tenth abdominal segment) ovate, twice longer than wide, apex roundingly pointed.

Harpago, as viewed from a flattened lateral view, ovate with the dorsal margin extended into a blunt curved hook at apex of middle third, in front of this an external recurved hook present.

Base of aedeagus a semi-rectangular plate, anteriorly deeply cleft, posteriorly bearing two slender sclerotized rods which extend caudad to a point about two-thirds of the length, then bend cephalad at an acute angle, most of the exposed portion of the hook membranous, the terminal portion in the form of a slender sclerotized spine. The theca unique for the genus, its dorsal posterior margin extended caudad as a triangle, the apex of which is deeply cleft into two slender lobes. The dorsal margin of the theca forms two broad, widely separated lobes, with a deep wedge-shaped cleft between.

Comparative Notes: Ball distinguished **minor** from **rhyparus** by the characters of a wider vertex and the posterior tibia being unmodified while in **rhyparus** the posterior tibia was distinctly flattened basally, the heavy spines appearing as serrations.

In the present study **minor** is grouped with several other species which have the lateral lobe of the ninth abdominal segment of the male broader, more plate-like, rather than lobe-like, the pronotal shoulders shorter and narrower and the hind tibia normal. The species represented in this group are **bicornis, foliatus** and **ventosus.** For comparison of **minor** with these species see the notes in the description of **bicornis.**

Location of Types: In the National Museum Collection, Washington, D. C.

Distribution: Described from specimens collected in Colorado and Utah. Specimens were at hand for study from Grand Junction and Montrose, Colorado and from Wellington, Utah.

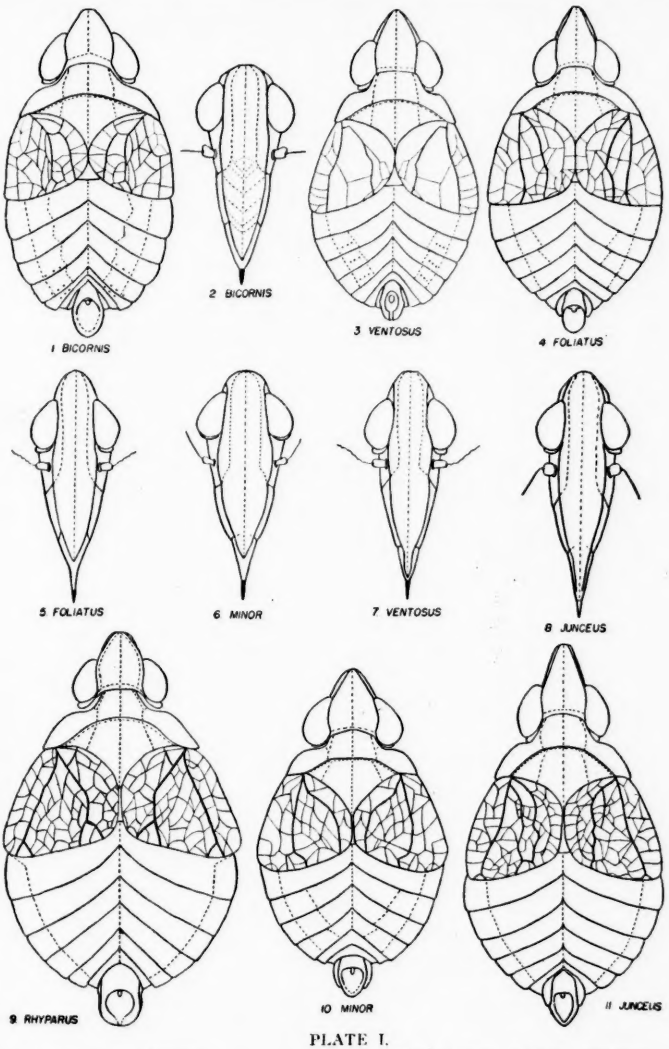

PLATE I.

1. Dorsal view, **bicornis**
2. Ventral view of head, **bicornis**
3. Dorsal view, **ventosus**
4. Dorsal view, **foliatus**
5. Ventral view of head, **foliatus**
6. Ventral view of head, **minor**
7. Ventral view of head, **ventosus**
8. Ventral view of head, **junceus**
9. Dorsal view, **rhyparus**
10. Dorsal view, **minor**
11. Dorsal view, **junceus**

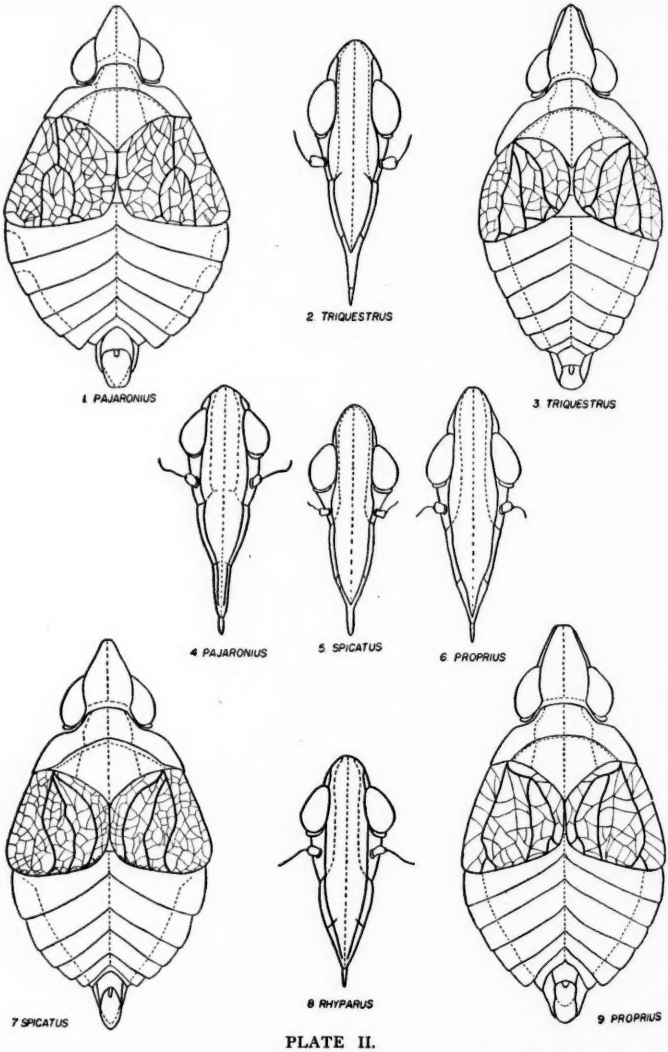

PLATE II.

1. Dorsal view, **pajaronius**
2. Ventral view of head, **triquestrus**
3. Dorsal view, **triquestrus**
4. Ventral view of head, **pajaronius**
5. Ventral view of head, **spicatus**
6. Ventral view of head, **proprius**
7. Dorsal view, **spicatus**
8. Ventral view of head, **rhyparus**
9. Dorsal view, **proprius**

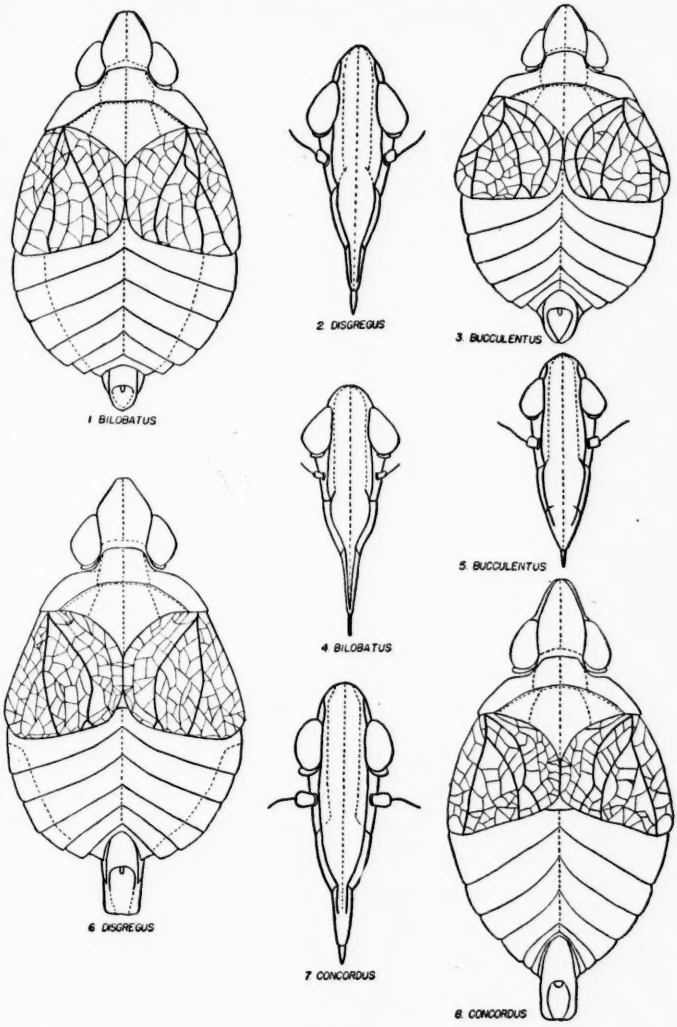

PLATE III.

1. Dorsal view, **bilobatus**
2. Ventral view of head, **disgregus**
3. Dorsal view, **bucculentus**
4. Ventral view of head, **bilobatus**
5. Ventral view of head, **bucculentus**
6. Dorsal view, **disgregus**
7. Ventral view of head, **concordus**
8. Dorsal view, **concordus**

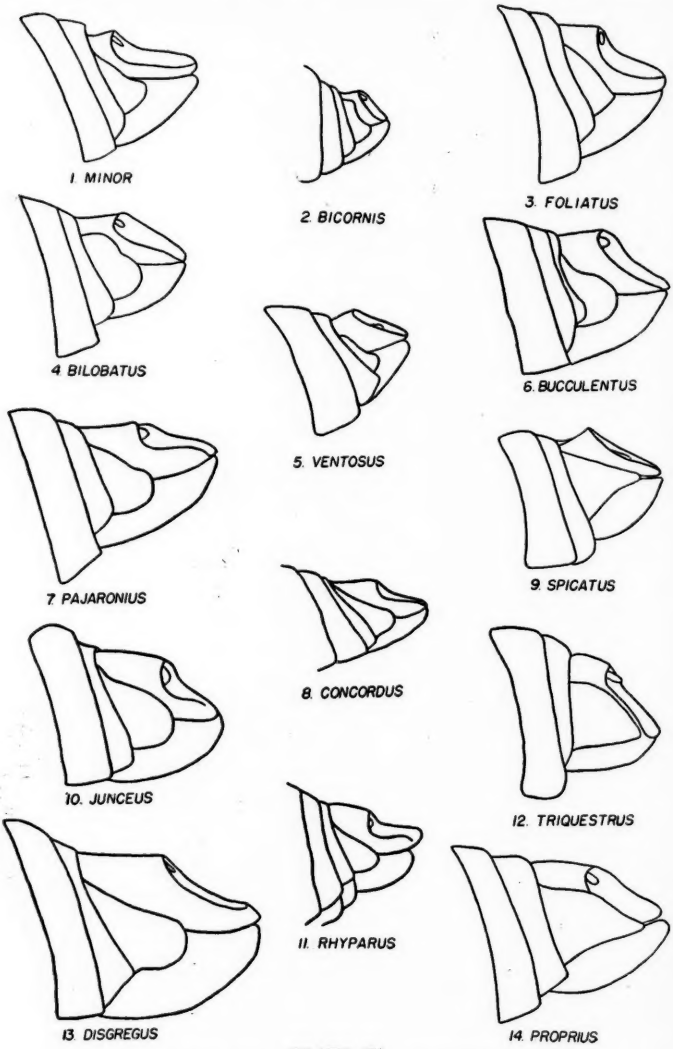

PLATE IV.
LATERAL VIEW OF MALE NINTH ABDOMINAL SEGMENT

1. **minor**
2. **bicornis**
3. **foliatus**
4. **bilobatus**
5. **ventosus**
6. **bucculentus**
7. **pajaronius**
8. **concordus**
9. **spicatus**
10. **junceus**
11. **rhyparus**
12. **triquestrus**
13. **disgregus**
14. **proprius**

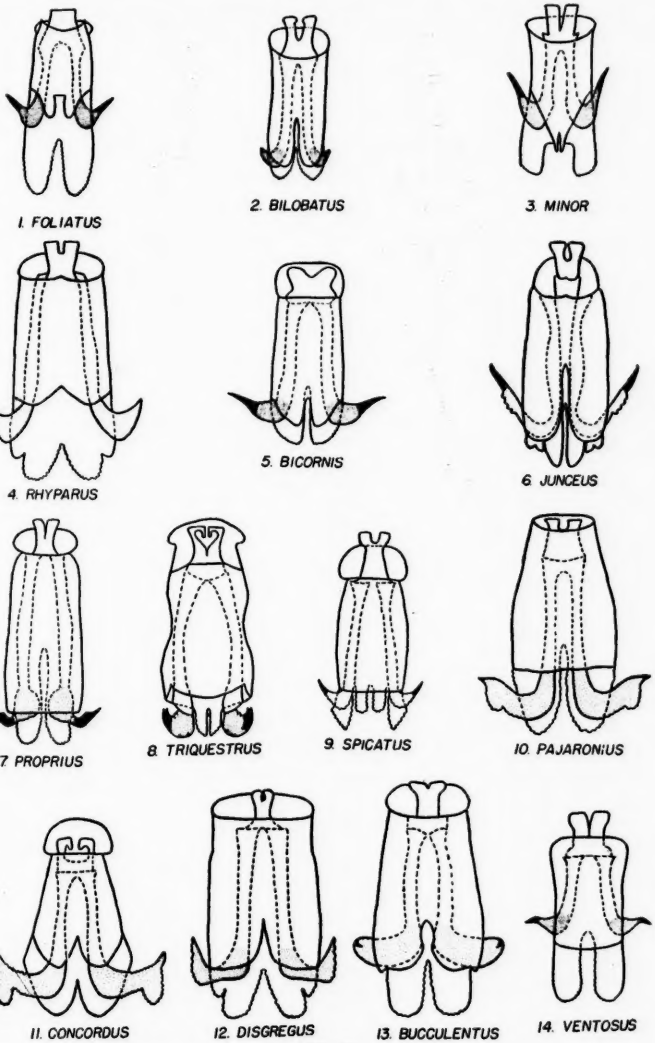

PLATE V.

DORSAL VIEW OF AEDEAGUS AND THECA

1. **foliatus**
2. **bilobatus**
3. **minor**
4. **rhyparus**
5. **bicornis**
6. **junceus**
7. **proprius**
8. **triquestrus**
9. **spicatus**
10. **pajaronius**
11. **concordus**
12. **disgregus**
13. **bucculentus**
14. **ventosus**

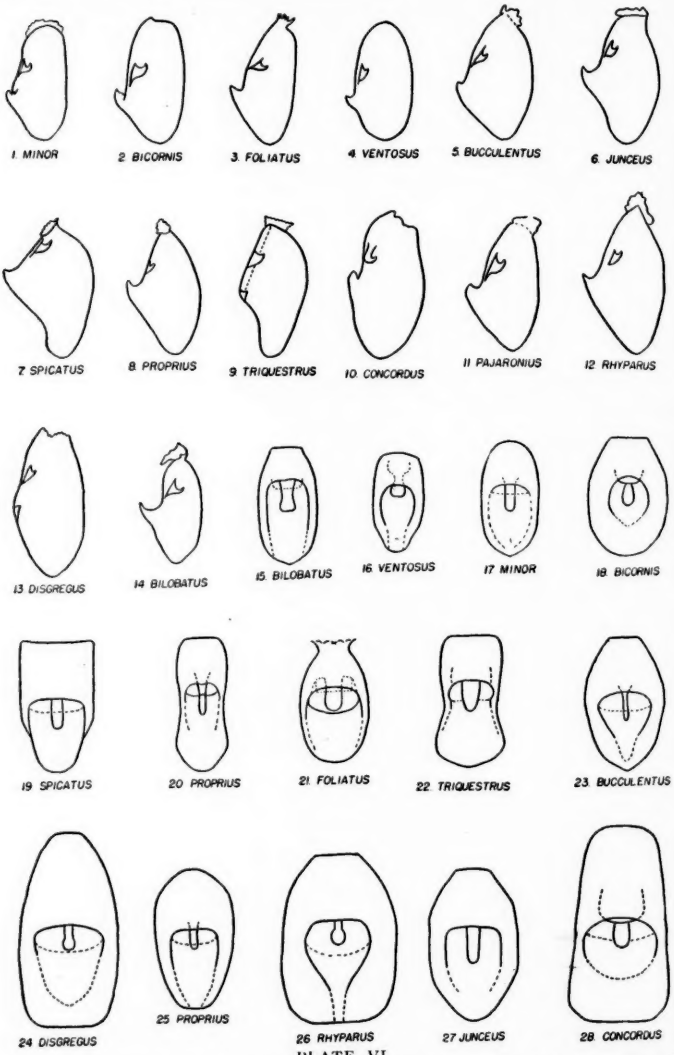

PLATE VI.

Flattened Lateral View of Harpagones

1. **minor**
2. **bicornis**
3. **foliatus**
4. **ventosus**
5. **bucculentus**
6. **junceus**
7. **spicatus**
8. **proprius**
9. **triquestrus**
10. **concordus**
11. **pajaronius**
12. **rhyparus**
13. **disgregus**
14. **bilobatus**

Anal Flap (10th Abdominal Segment) of Male

15. **bilobatus**
66. **ventosus**
17. **minor**
18. **bicornis**
19. **spicatus**
20. **proprius**
21. **foliatus**
22. **triquestrus**
23. **bucculentus**
24. **disgregus**
25. **proprius**
26. **rhyparus**
27. **junceus**
28. **concordus**

THE TWELFTH OR 1942 ANNUAL INSECT POPULATION SUMMARY OF KANSAS*

ROGER C. SMITH and E. G. KELLY[1]
Kansas Agricultural Experiment Station

This insect population summary for Kansas covers the calendar year 1942 and is the twelfth in a continuous series which began with the year 1931.[2] The information recorded here is based on a summary of 258 questionnaires of the score card type from the sources indicated in Table I together with the observations and comments of the authors, their colleagues and of those returning the score sheets.

Table I

Source of Questionnaires Returned and Summarized for this Report

	No. in July	No.in October
Group 1. Entomologists in the state	14	14
Group 2. County Agricultural gents	36	65
Group 3. Farmers, mostly college graduates	6	7
Group4. Vocational agricultural teachers	58	38
Total reports of each group	114	144
Grand total of all questionnaires summarized for this report	258	

Summary of Weather Conditions (Fig. 1 and Table II) in Kansas by Months for 1942[3]

January was deficient in precipitation in practically every part of the state, though the soil was saturated in all but the southwestern counties. The first ten days were exceptionally cold but the remainder of the month was mild and pleasant with ample sunshine. Much snow fell in the northern and western parts of the state on the first day of the month and the ground remained covered with snow during the cold period.

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*Contribution No. 524 from Department of Entomology.

[1]Associate Entomologist, Kansas Agricultural Experiment Station and Extension Entomologist, Division of College Extension, respectively.

Recognition and appreciation for assistance given during the preparation of this summary is due to the same sources and largely to the same individuals who supplied information for more recent, previous reports. They consist of the group given in Table I.

[2]For the other summaries in this series, see the **Journal of the Kansas Entomological Society** for the summaries for 1931 (vol. 5); 1932 (vol. 6); 1933 (vol. 7); 1936 (vol. 10); 1937 (vol. 11); and 1939 (vol. 13) and **Transactions of the Kansas Academy of** Science for 1934 (vol. 38); 1935 (vol. 39); 1938 (vol 42); 1940 (vol 44); 1941 (vol 45.).

[3]Based largely on Climatological Data, Kansas Section, by S. D. Flora. U. S. Dept. Agr. Weather Bureau, v. 56, 1942.

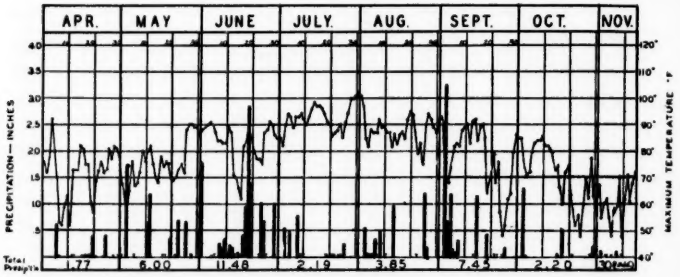

Fig 1. Daily rainfall and maximum temperature chart for the growing season of 1942 at Manhattan, Ks. Chart prepared by D. A. Wilbur.

February was characterized by frequent precipitation, rather heavy snowfall and prolonged cold after the opening days. The soil in eastern counties was excessively wet. From three to six or more inches of snow fell in almost every county. A cold wave arrived on the 16-17th and the cold persisted through the remainder of the month. It was a favorable month for wheat except in the eastern third of the state.

March had ample precipitation, above normal temperature and normal sunshine. Snowfall was light except in the western third where four to eight inches fell. Wet soil delayed farm work and cold weather the last week held back truck crops and fruit bloom.

April was one of the wettest, mildest and most favorable months for crop growth that was ever recorded in Kansas for this time of year. Rains were frequent. There was no freezing weather during the last half of the month and crops made fine growth.

May was one of the wettest on record in northeastern counties but in the western third, there was less rain than in any other May except one. Temperatures were abnormally low for the first 25 days. The closing days were hot and sultry. Some hail and windstorms occurred and the upper Arkansas river valley was flooded. Wet soil hampered corn planting but pastures and truck crops made fine growths.

June was exceptionally wet and cloudy. Numerous floods, wind and hail storms occurred in the state. There was a near record cold period near the middle of the month. Wheat harvest and haying were seriously hampered by frequent rains and wet soil.

July was hot and dry. It resembled this month for the last 13 years except the temperature was not so high. Rainfall was deficient except in the southeastern part of the state. Sunshine was normal.

August had frequent rains, some of which were heavy. It was

TABLE II.

Summary of Weather Data for the State of Kansas for the period September 1, 1941 to December 31, 1942.

Month	Temperature in degrees Fahrenheit					Precipitation in inches					
	State Average	Maximum	Minimum	Average for 56 years	Departure from normal	State Average	Average for 56 years	Departure from normal	Eastern third	Middle third	Western third
September 1941	71.0°	103°	32°	69.8°	+1.2°	4.76	2.80	+1.96	6.51	4.72	3.05
October "	58.4°	95°	20°	57.3°	+1.1°	6.51	1.97	+4.54	10.29	6.57	2.66
November "	45.1°	87°	- 4°	43.2°	+1.9°	0.88	1.29	-0.41	1.29	0.88	0.47
December "	37.8°	77°	-16°	33.2°	+4.6°	1.09	0.84	+0.25	1.48	1.08	0.71
January 1942	30.3°	72°	-27°	29.8°	+0.5°	0.37	0.69	-0.32	0.57	0.32	0.22
February "	32.3°	72°	-17°	33.0°	-0.7°	1.17	1.00	+0.17	1.78	1.07	0.65
March "	44.4°	83°	11°	43.4°	+1.0°	1.45	1.43	+0.02	1.51	1.65	1.18
April "	58.1°	94°	17°	54.8°	+3.3°	4.47	2.57	+1.90	4.05	4.32	5.03
May "	63.2°	102°	28°	64.0°	-0.8°	2.53	3.80	-1.27	4.42	2.52	0.85
June "	72.7°	102°	40°	73.8°	-1.1°	6.49	4.01	+2.48	7.58	7.34	4.54
July "	80.6°	111°	48°	79.2°	+0.8°	2.25	3.11	-0.86	2.66	1.93	2.15
August "	76.9°	108°	48°	77.9°	-1.0°	4.57	3.17	+1.40	5.80	4.74	3.18
September "	66.6°	100°	21°	69.8°	-3.2°	4.48	2.83	+1.65	6.87	4.82	1.74
October "	57.8°	95°	10°	57.3°	+0.5°	2.80	1.98	+0.82	2.61	2.97	2.83
November "	45.4°	87°	- 3°	43.2°	+2.2°	0.75	1.28	-0.53	1.58	0.45	0.21
December "	32.4°	73°	-11°	33.2°	-0.8°	1.82	0.86	+0.96	2.76	1.74	0.97
Average extremes or totals for 1942	55.0°	111°	-27°	54.9°	+0.25°	33.15	26.73	+6.42	41.99	33.15	23.55

the ninth wettest August since 1887 and the second coolest in nine years. There were several violent storms and some rivers overflowed.

September was one of the wettest and coolest on record. Killing frosts occurred on the 24th, 26th and 27th in various parts of the state. These dates are exceptionally early and caused considerable damage to late corn and sorghums. There was also more cloudiness than usual.

October had temperatures and rainfall slightly above normal.Rains were more frequent than usual but there were ten days of Indian Summer following the 4th. It was a fine month for wheat and fall pastures.

November was characterized by mild weather, rather light but somewhat deficient precipitation and excessive cloudiness. It was a good month for wheat and corn husking.

December was one of the wettest and cloudiest Decembers on record. The snowfall which totaled 10 to 15 inches in many places averaged 9.8 inches for the state was almost a record and the temperature averaged below normal. All parts of the state had an excess of precipitation. Only four years in 56 had greater amounts.

The year 1942, as to weather, was cool and wet, with a cold late spring and an abnormally early killing frost. The fall was wet with less than normal amount of sunshiny weather.

Crop Production Summary for 1942[1]

Kansas farmers produced the second largest crops on record in 1942 according to the Federal and State crop summary.

Production was 21 percent above 1941 and 74 percent above the five-year (1936-'40) average.

The wheat crop of 206,775,000 bushels, was the largest since 1931 when production totaled 251,885,000 bushels. The 19.5 bushels per acre wheat yield in 1942 has been exceeded only twice in Kansas history—in 1882 and 1914. Yields for the western half of the state exceeded all previous records while in eastern counties yields were far below average. Production of volunteer wheat was termed "most unusual".

Corn production was placed at 90,060,000 bushels compared with 57,224,000 bushels in 1941 which was the largest crop since 1932. The 28.5 bushels per acre yield was the highest since 1915 when the average was 31 bushels.

Estimates on other crops: Oats—46,232,000 bushels compared with 38,856,000 bushels for the preceding year—the largest production since 1920 except in 1941.

[1]From Kansas 1942 Crop Review. Kans. State Bd. of Agr., Agricultural Statistics Division, Dec. 20, 1942. Mimeographed Release.

Barley—17,186,000 bushels, compared with 26,520,000 last year.

Hay crops—All tame hay production was 2,059,000 tons, largest since 1928, compared with 1,556,000 tons in 1941.

Sorghums—18,124,000 bushels total for grain, or 17 percent less than last year. Late September freezes stopped plant growth earlier than usual and resulted in serious damage.

Soybeans—2,544,000 bushels, more than four times last year's crop and exceeds the combined production of all previous years.

Flaxseed—1,785,000 bushels or 56 percent above 1941 production and the largest crop since 1891.

Potatoes—754,000 bushels this year and 406,000 last.

Peaches—37,000 bushels compared with 44,000 in 1941.

Pears—144,000 bushels and 98,000 bushels last year.

Grapes—2,900 tons as against 2,100 in 1941.

Rye—1,287,000 bushels as against 979,000.

Broomcorn—1,900 tons this year and 3,100 last.

Alfalfa seed—134,000 bushels compared with 150,000 last.

Sweet clover seed—90,000 bushels and 109,000 last.

Lespedeza seed—9,100,000 pounds this year, 9,200,000 last.

Weeds were exceptionally plentiful in Kansas as well as in nearby states in 1942. Rats were more plentiful and destructive than for some years. Flocks of starlings became more common in eastern Kansas and through Missouri. Purple martins succeeded in rearing their full broods to flight before the hottest weather and with less loss than for a number of years.

Descriptive Account of the More Important Insect Activities and Climatic Relationships during 1942

Ants appeared to be normal in population during 1942. They were more widely reported in the questionnaire but the scores were almost wholly 1's and 2's. There were more 3's and 4's in 1941 than in 1942.

The **yellow ant** caused the usual number of inquiries during March.

Army worms were more plentiful in 1942 than for several years. The larvae were observed fairly plentiful in June in Riley County. The **wheat head army worm** did some actual damage to wheat which had gone down, but this species was less numerous and destructive than in 1941.

Aphids in general were not particularly abundant nor destructive during 1942. Several species threatened severe damage but they were thwarted largely by natural forces.

The **green bug** developed into a devasting outbreak in Texas in January and February and in Oklahoma in March. There was every

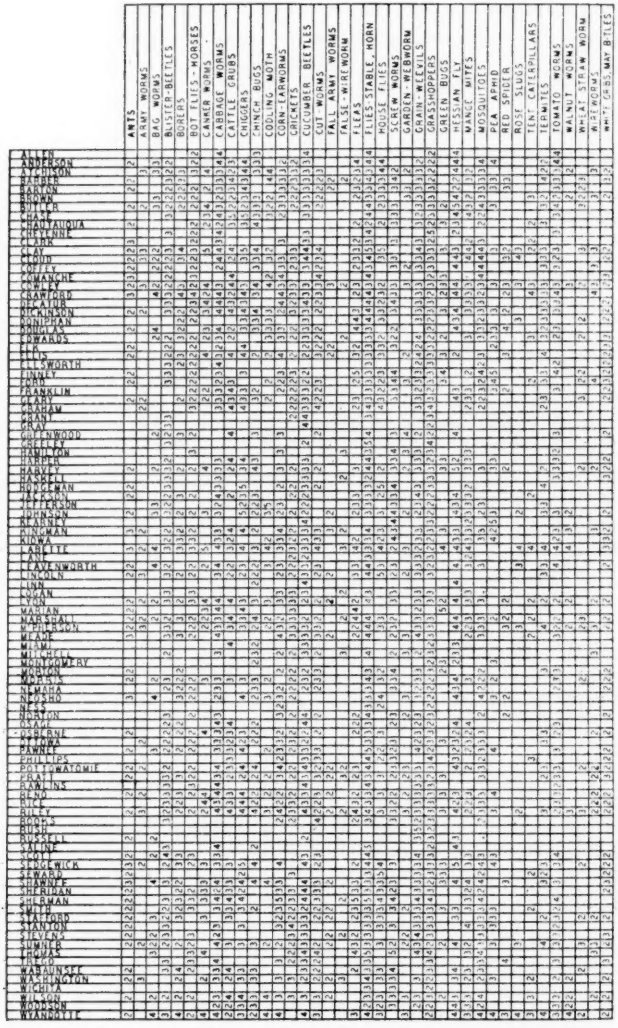
ANTS
ARMY WORMS
BAG WORMS
BLISTER BEETLES
BORERS
BOX ELDER BUGS - HORSES
CABBAGE WORMS
CATTLE GRUBS
CHIGGERS
CHINCH BUGS
CODLING MOTH
CORN EARWORMS
CRICKETS
CUCUMBER BEETLES
CUTWORMS
FALL WEBWORMS
FALSE WIREWORMS
FLEAS
FLIES STABLE, HORN
HOUSE FLIES
SCREW WORMS
GARDEN WEBWORM
GRAIN WEEVILS
GRASS BURRS
GRASS BUGS
HESSIAN FLY
MANCE MITES
MOSQUITOES
PEA APHID
RED SPIDER
ROSE SLUGS
TENT CATERPILLARS
TERMITES WORMS
WANDT WORMS
WHEAT STRAW WORM
WIREWORMS
WHITE GRUBS MAY BEETLES

Table III. Population summary of the more common and important insects in Kansas for 1942, as indicated by 258 questionnaire score sheets from nearly all counties.

Key—

1. Scarce.
2. Plentiful but no noticeable or reported damage.
3. The species was abundant. Some damage was seen or reported.
4. Local outbreak. The species was doing severe damage in certain fiields.
5. The species was in general outbreak. The insects were doing their greatest damage or were as plentiful as they ever get get in a locality.

indication in late March or early April that this species would continue its destruction of wheat beginning at the southern border of Kansas and continuing entirely across the state. However heavy general rains fell on April 6 to 8 throughout this area and in southern Kansas which checked these aphids completely. The cool weather up to the rains favored the species. It was as expected that they attacked sown wheat instead of older and thicker volunteer wheat. The parasites began to build up in Oklahoma and by April 20, the outbreak to the south was on the decline and the threat was entirely over by the 28th.

First reports of green bug damage in Kansas came from Cowley Harper and Sumner counties. Somewhat more important damage occurred in Meade county and the Arkansas Valley which reflects its western distribution to the south. By mid-April, the greenbug was readily found in Riley and many other counties but were neither numerous nor damaging. Roy Fritz found them in mid-April in Harper, Barber, Comanche, Clark, Sedgwick, Sumner and Ford counties, Parasites and lady beetles built up to effective numbers and wheat made rapid growth during April which eliminated this threat and no real damage occurred in the state.

This species again occurred in fall sown wheat in October. R. H. Painter reported it apparently increasing during autumn.

Corn leaf aphids were plentiful during the fall in some fields in 1942. D. A. Wilbur reported the species as more plentiful in corn and sorghum in the western half of the state than for several years. R. H. Painter observed many molted skins and aphids of this species killed by a black fungus on tassels of these crops in north central Kansas during October.

Pea aphids increased rather slowly during the spring and reached fairly large numbers by May but alfalfa made such rank growth that

the aphids did little commercial damage. A few aphids were found in Pawnee county in early March and in Riley county in April. By mid-April, they were plentiful but growing conditions for alfalfa were excellent and the crop easily outstripped the aphids. They were reported on peas in Kiowa and Stanton counties.

Some foliage damage and stunted plants occurred in Pawnee, Harper, Finney, Ford, Kearney, Stanton and Meade counties. Stunted plants were reported from Geary, Wilson, Barton, Reno, Anderson and Wyandotte counties. Some alfalfa was cut in Riley county May 1 to check the aphids. Lady beetles were plentiful everywhere in April. Rains about the middle of May caused a sharp decrease in numbers of pea aphids and the spring pea aphid threat to alfalfa was over.

This species was readily found in alfalfa in the fall but it was neither seen nor reported in large numbers.

Aphids on roses and tulips were common in Riley county during April, requiring control efforts to protect the plants.

Snowball aphids were readily found but did minor curling of leaves in April.

Elm leaf aphids were less numerous and less troublesome than for several years.

Aphids on cucumbers and cantaloupes were reported at 3 from Ellis, Marshall and Riley counties; on garden crops at 4 from Barber, at 3 from Kingman, at 2 from Cloud counties; on roses from Riley and Marshall counties at 3; on corn from Marshall county at 2; on elms from Kiowa county at 3; on hard maples from Douglas county at 4 and on tulips from Riley county at 3.

Bagworms on evergreens, apple and willows were distinctly more common and more widely distributed in 1942 than in 1941. They were reported as particularly abundant in northeastern, southeastern and Kaw Valley counties. This insect appears to be on the increase in the entire eastern half of the state, especially the eastern fourth.

Bees produced little more than half a crop of honey in 1942 in spite of an excellent growth of sweet clover. Rains and cloudy weather prevented flying activity in early June when the colonies had peak population. When the weather cleared, white clover did not appear to produce as much nectar as was expected. Many beekeepers had more than usual difficulty in maintaining queens and success with requeening. There was a short, intense nectar flow during August and colonies built up their numbers on it. Then the nectar flow ceased and the colonies greatly reduced their winter stores. Some colonies went into winter with small stores of honey.

Blister beetles apparently declined in numbers during 1942. They

were reported from fewer counties and rarely scored higher than 3. Some damage particularly to gardens was done however in Finney, Scott, Morton, Ellis and Saline counties. Blister beetle injury to soldiers during field activities was reported during the summer. The decline no doubt corresponds to the small grasshopper population since the blister beetle larvae feed on grasshopper egg pods.

Borers in trees, particularly the flat headed borer, continued the decline in numbers and injury over 1941. They were scored at 1 to 3 generally which situation is believed to be about normal or average. Severe damage (scores of 4) was reported for Sherman, Kiowa, Cloud, Clay, Wabaunsee, Reno, Harvey, Labette, Crawford and Wyandotte counties. Damage to elm was reported from Ellis and Geary counties; to ash from Wabaunsee; to maple from Harvey; to fruit trees from Kingman, Harvey and Cowley counties; to hedge in Cowley county and to peach in Riley county.

Boxelder bugs continued at virtually the same large population in 1942 as in 1941. They were exceptionally plentiful during the spring and an almost equally large population went into hibernation in the fall.

Bot flies were somewhat more widely reported for 1942 than in 1941 but the numbers and injuries were probably closely comparable with 1941. A virtual epidemic of flies in July was reported for Lyon county.

Cabbage worms appear from the questionnaire reports to have been more numerous and destructive in 1942 than in 1941. While they are always a problem to gardeners they were scored from twice as many counties as last year and with 4's predominating. The increase in the number of gardens and renewed interest in gardening because of the war was probably a factor in the 1942 reports.

Canker worms while apparently less numerous in 1942 than in 1941 again caused widespread defoliation of elms and hackberry trees along creeks and woods in the state from Jewell and Mitchell counties eastward. Banding and spraying have reduced them to small numbers in many cities as in Manhattan for example. L. C. Aicher reported severe defoliation of hundreds of trees in the country in Ellis county. The trees soon put out new leaves and the growing conditions were generally favorable to the trees. Cankerworms were reported for fewer counties than in 1941 but severe damage was recorded for Decatur, Ellis, Osborne, Rice, Reno, Harvey, Butler, Cowley, Labette, Lyon, Wyandotte and Atchison.

The moths began emerging in Riley county about February. All of the fall species were out by March 1. The larvae were about half grown by May 1 and leaf destruction was beginning to be apparent.

Cactus insects reduced cactus to the smallest numbers in years. Many pastures were virtually cleared of cactus chiefly as a result of insect attacks. The cactus leaf bug, **Chelinidea vittiger** Whl., ap pears to have been the chief factor. Decay which may envelop the entire plant follows feeding by these bugs. The moth borer, **Melitara** appeared to be less plentiful than in 1941. The cochineal insect, a mealy bug, occurred rather wirely on cactus in Kansas during 1841. This is believed to be a first report of its presence in numbers.

Cattle grubs were scored somewhat higher and reported from more counties in 1942 than in 1941. The publicity given to cattle grub control campaigns may be in part responsible for more reports. These pests appeared to be plentiful in all but the southwestern quarter of the state. Approximately 3000 farmers applied derris for cattle grub control to 50,000 cattle during the winter of 1941-42.

Colorado potato beetles were the scarcest for many years. Some growers in the Kaw Valley and most gardeners around Manhattan did not apply insecticides this year for them and the foliage damage was negligible. Some dusting to protect the crop was done in early June when potatoes were in bloom. Observations indicated that only isolated potato plants were defoliated. At digging time, pupa of this species were plowed up in noticeable numbers.

Cedar scales were less numerous than in 1941 but they continued to attract attention. According to G. A. Dean, **Cryptaspidiotus shasta** Coleman is now found especially in wild, red cedars as far west as Phillips, Rooks, Edwards and Barton counties. It appears in practically all counties east of Phillips and Russell and north of the Republican and Kaw rivers. According to H. B. Hungerford, it is found in the following counties south of these rivers: McPherson, Marion and Douglas.

Lecanium fletcheri=L. corni, according to H. B. Hungerford, is known to occur practically all over the state. It has been abundant enough on juniper to require some attention at Pratt, Great Bend, Pawnee Rock, Larned, Kingsley, Mount Hope, Kingman, Belle Plaine and Independence. Specimens from Kansas City, Lawrence, Ottawa and Topeka have been seen.

Pseudococcus juniperi was reported by Hungerford damaging cedars at Pratt, Haviland, Greensburg, Medicine Lodge, Great Bend, Hillsboro and Dodge City.

Chiggers were again abundant and annoying over all but many of the extreme western counties, but the evidence indicates that they were less plentiful than in 1941. A single sulphur dusting in many lawns in Manhattan largely disposed of them for the season. There

was a slight reduction in the letters of inquiry and newspaper articles about chiggers over the previous year.

Chinch bugs early appeared threatening in the eastern half of the state but little damage was done and the reports showed them to have declined in numbers from 1941. The rains before and at harvest were distinctly unfavorable to them. Many nymphs were destroyed before they left the wheat fields by the heavy rains of May, June and July. Migration to corn was slow and periodic. Milo sorghum was damaged in several central counties.

The county agents reported that 696 farmers made creosote barriers against chinch bugs in 1942 and 4,942 combatted chinch bugs by some method. More preparation had been made than usual to keep chinch bugs under control in 1942 but the cool wet weather was so unfavorable to them that little artificial control was necessary. Fourteen large oil tanks were filled with chinch bug oil as a part of the precautionary program but little of it was used.

The fall survey indicated that fewer adult chinch bugs went into hibernation than in recent years.

Codling moths apparently increased somewhat in numbers and injuries in 1942 over 1941. This was probably due to poorer spraying as a result of the labor, insecticide and spraying equipment situation related to the war effort. The moths emerged on May 13 and the first cover spray was put on beginning with May 23.

Columbine leaf miners were exceptionally numerous and destructive in older columbine plantings.

Corn ear worms were somewhat less plentiful than in 1941. The damage to the corn crop was typical and normal. Infested sorghum heads were abundant particularly in the western half of the state during the fall. Corn ear worms were neither unusually plentiful nor destructive to alfalfa or tomatoes during the year.

Cucumber beetles, in common with other garden insects, were more widely reported in 1942 than in 1941 and the damage done was perhaps slightly greater. There were many reports of plantings being completely ruined but in general these pests were somewhat less numerous and destructive than during the drouth years.

Crickets were distinctly less numerous and annoying in homes during 1942 than in 1941. The cooler and more moist season kept them outdoors. Fewer reports were received of damage to alfalfa seed.

Cutworms were clearly less numerous and destructive in 1942 than in 1941. They were less extensively reported and the scores were lower. There were a few army cutworms, notably at Oberlin

in March but the garden species occurring in April and May were most commonly indicated. They were plentiful in Riley, Reno, Decatur, Kingman and Ellis counties.

The pale western cutworm was apparently present in the region of Graham county.

Wheat was damaged in Comanche county in June, probably by the wheat head army worm.

Fall army worms were present chiefly in the eastern half of the state but in smaller numbers than in 1941 and no damage of consequence was seen or reported. The larvae occurred in alfalfa fields but their presence in gardens in Ellis county was reported.

Fleas on dogs, cats and hogs were definitely more plentiful and annoying in 1942 than in 1941. They were scored higher and there were more reports of them than in 1941. While they were troublesome in all parts of the state, the reports indicated the largest population in the northeastern fourth of the state. The damp weather apparently favored them as they reached a peak, judging by correspondence in early July.

Flies which always fluctuate widely and suddenly in the state were definitely more plentiful and annoying during 1942 than in 1941. The ample rains provided favorable propagating places for them and several peaks in numbers were attained. They were scored at 3 to 5 in all parts of the state. They were in outbreak during June and July.

House flies were not listed specifically on the questionnaires but they were quite generally reported and scored at 2 to 5 over all of the state except some far western counties. Goertz reported them as worse than usual in Seward county.

Screw worm flies were slightly more numerous and more widely distributed during 1942 than in 1941. This species was reported as being in virtual outbreak in Comanche, Cowley, Harper and in some southeastern counties in April. These flies were reported as commonly appearing first each year around railroad feeding yards such as occurs at Arkansas City, Herington, Emporia and Manhattan.

Garden webworms were slightly more numerous in 1942 than in 1941 and were more widely distributed. However there was little damage by them seen or reported.

Grain insects were fully as numerous and widespread in 1942 as in 1941. The scorings for the first half of the year were slightly higher than for the last half.

An abundance of rain at harvest time resulted in much of the grain going into storage with a relatively high moisture content. In

this condition it is highly susceptible to infestations by insects. Grain inspection records indicate that insect infestation in commercial shipments of grain was fully as severe in 1942 as in the preceding year which with the exception of 1939 was classed as one of the worst years on record.

The insects most abundant in farm-stored grain in Kansas and causing most trouble was the lesser grain borer, the rice weevil, the flat grain beetle, the rust red flour beetle, the cadelle and sawtoothed grain beetle.

Grasshopper populations declined during 1942 to the smallest numbers in about ten years. The fall survey in 1941 indicated that grasshoppers would not be so numerous in 1942 as they had been in 1941. The spring opened late with grasshopper eggs somewhat delayed in hatching. By the middle of May, there was a 60 percent hatch. The weather changed from dry to wet and from that time on until late summer the grasshoppers had plenty of grasses and weeds to feed upon. They caused little damage to crops in general.

The rains during the fall of 1941 apparently interfered with grasshopper egg laying and the cold, wet spring was unfavorable for hatching. The first brood appeared late and the wet June further retarded their growth.

Fall sown wheat required little baiting to protect it from invading grasshoppers. In the central and eastern counties, grasshoppers caused a little damage to alfalfa and the newly sown alfalfa.

The damage to wheat and barley was light in all areas. Slight damage occurred to corn in northwestern counties. The damage to fall sown wheat in 56 western counties was light. In general the crop injury by grasshoppers was the lightest since 1932. Most of the poison bait was applied in the four northwestern counties.

Grasshopper bait sowing was less general than usual. The county agents reported that 3,418 farmers sowed 423 tons of bait (dry weight) in 60 counties in 1942. The estimate of needs was 2,725 tons. The fall egg survey indicated that in general fewer than usual eggs had been deposited for the 1943 grasshopper population.

Harlequin cabbage bugs were present all summer in Riley county. H. R. Bryson reported some cabbage ruined by them and in early September, they attacked turnips.

Hessian fly populations in eastern Kansas increased slightly over 1941 but growing conditions were so favorable for wheat that an excellent crop was harvested. R. H. Painter summarized the hessian fly situation in 1942 as follows:

"Throughout 1941 weather conditions were favorable for Hessian fly development and the fact that farmers were encouraged to leave volunteer to grow aggravated the situation. At the beginning of 1942, wheat as far west as Reno and Phillips counties was fairly generally infested. In Sedgwick, Cowley, Wabaunsee and some other counties much wheat was killed by fly before or during the winter of 1941-42. In Sedgwick county in February, the county agent reported 40 to 50 flaxseed per square foot in some fields. In the area severe infestations extended as far west as Mayfield in Sumner county. In southeastern Kansas, the fall of 1941 infestation killed volunteer in some places and early planted wheat was almost universally infested. Barley carried some infestation also. Many farmers in this area waited until after the safe seeding date and were prevented by weather conditions from planting wheat after that time.

"In the spring of 1942 the first eggs were seen at Manhattan April 10 and the eggs of the second brood were abundant May 27. The spring infestation was found at least as far west as Mitchell and Kingman counties with severe damage in some areas. An infestation was also reported in Cheyenne county by J. H. Parker. The heavy June rains caused much lodging in the wheat and thus fly injury was less apparent than it would otherwise have been. In some areas a summer generation occurred on early volunteer in July but in this area a general infestation did not occur until late in September, and it was light or absent in wheat planted after the safe seeding date. Infestation was heavy in seeded wheat in Clay, Cloud and Reno counties and present at least ss far west as Phillips. In the northeastern part of Russell county, a light infestation was found only in volunteer among stubble of last year's volunteer. Apparently the fly was killed by the drouth of the thirties in most of southwestern Kansas and is now returning slowly westward."

The heavy loss to wheat by this insect in 1941 suggested a control campaign for the fall of 1941. A result of the publicity campaign in 52 eastern counties was that more than 30,000 farmers waited for the safe-seding date to plant wheat and many were caught by the rains with no wheat planted. It was estimated by the State Bureau of Crop Estimates that about 1,000,000 acres did not get planted to wheat on that account. The Hessian fly thus was blamed for the loss. Many farmers however, planted their crop before the heavy rains and some during the drier times between rains. Most of that wheat was heavily infested and some of it was total loss. Of the early and late planted wheat, it was estimated that the loss totaled about 6,000,000 bushels both in the fall and spring. The land that was not planted to wheat in the fall of 1941 was mostly planted to soybeans, corn and sorghum.

Lice on cattle were observed to be somewhat more plentiful and annoying than usual during the spring and fall. These pests persisted in numbers well up into June which is longer than usual due probably to the cool wet spring. Sucking lice were reported as abundant on calves during October.

Hog and chicken lice were observed and reported to have been somewhat more numerous than usual in the Kaw Valley counties during April.

Maple worms injury to maple foliage was observed early in July in counties north and east of Shawnee. The defoliation appeared to be no more severe than usual however.

Mosquitoes occurred in several well defined peaks as a result of the rainy seasons. They were abundant during June and August to October inclusive. They were especially annoying in mid-September in Riley county.

Potato tuber moths were not found in the state though scouting trips were made by state and federal officials in the potato districts to look for it.

Rose sawflies were rather scarce and inconsequential in the spring of 1942. The few reports of them were largely from the Kaw Valley and south central counties. While brown rose foliage commonly resulting from rose sawfly feeding was common, favorable growing conditions quickly enabled the plants to recover.

Rose bud worms were scarce and below the numbers of 1941.

Sheep ticks or keds were emphasized in extension publicity and about one-fourth of the more than 600,000 native sheep were dipped for keds. It is doubtful whether these insects were more plentiful in 1942 than usual.

Southern corn root worm (Diabrotica 12-punctata) were apparently more numerous and destructive during 1942 than for several years. The adults were extremely common all summer and the larvae were repeatedly reported damaging young corn. Injuries were reported especially from the Kaw Valley.

Southwestern corn borer (Diatraea grandiosella Dyar) population and damage to corn was the outstanding entomological event of 1942. D. A. Wilbur summarized the situation as follows:

"The southwestern corn borer, **Diatraea grandiosella** Dyar continued its sweep northward across Kansas during the 1942 growing season and has been found within 20 miles of the Nebraska border in Phillips county. This insect was first observed in Kansas in the

southern portion of Morton and Stevens counties in 1931. It was checked and probably eliminated in this section by the years of excessive drouth. The insect was not reported again in Kansas until the fall of 1941 when it was found to occur in at least 29 counties of the southwestern quarter of the state. There was some evidence to indicate that the borers may have been present in some fields in Kansas during 1940. During the 1942 growing season an additional 22 counties were found to be infested making a total of 53 infested counties. Further surveys would doubtless have added another eight to ten countiies to this list.

"The most heavily infested area includes a north-south strip of about 90 to 125 miles wide, the center of which extends on a direct line from Comanche to Ellis counties. There are sections within this strip where it was difficult to find an uninfested field of corn. Field heavily attacked by the first generation of borer showed damage from "dead heart" stunting, bushing and riddled stalks in addition to the girdling of the stalks by the larvae in their preparation for hibernation. Over certain areas the corn was attacked only by second generation borers which had migrated in as adults from other counties. Many of these fields suffered damage by girdling. In one field of 160 acres there was approximately 22 1-2 bushels of corn per acre on the ground after the picking machine had been over the field.

"A survey made during January 9 to 15 indicated that approximately 70 percent of the infested stalks were occupied by live borers. This strongly suggests that a large population of moths will be present to infest the 1943 corn crop."[6]

Stalk borer infestation in wheat was more conspicuous than usual in the central third of Kansas according to observations made by R. H. Painter. This was particularly noticeable next to weedy fence rows.

Strawberry leafrollers were plentiful in May but under the favorable growing conditions less damage than usual resulted.

Strawberry sawfly damage was serious in northeast Kansas the latter half of April, according to R. L. Parker. The foliage in some fields was severely damaged.

The sweet clover weevil (Sitona cylindricollis Fabr.) has not yet been found in Kansas in spite of a careful watch for it. This beetle has spread westward to Montana and has been taken in Nebraska and Missouri.

Termites were favored by the rains and were readily found in boards on the surface of the ground practically all summer. Inquiries

[6]Wilbur, D. A., Bryson, H. R. and Painter, Reginald H. A major outbreak of the southwestern corn borer in Kansas. Jour. Econ. Ent. 35 (6): 938-939: Dec: 1942.

about their control were no more common than in previous years and the scorings would indicate a slightly lower population and less injury than in 1941.

Tomato horn worms were slightly more numerous in 1942 than in 1941. They were also reported for more counties. In Riley county they were observed to have been scarce in numbers and of less consequence than usual.

Wheat stem maggots were reported by R. H. Painter to have been particularly abundant in early September in volunteer wheat. They were reported to be more abundant than usual in Dickinson, Saline, McPherson, Harvey, Sumner, Cowley, Marion, Butler, Morris, Chase, Pottawatomie, Clay, Washington, Marshall and Riley counties by the Extension Entomologist. White heads were plentiful at harvest time also but the loss was small.

Wheat straw worms in wheat were clearly more plentiful and destructive in 1942 than for several years. The weather apparently favored them. Many scores of 2 and 3 were reported from the leading wheat growing counties of the state.

Webworms occurred in numbers approaching an outbreak and caused some foliage damage to soybeans in July and to alfalfa in August in eastern Kansas. Young soybeans were killed or severely damaged in many fields. The damage was reported particularly severe in Lyon county.

White grubs were plentiful in 1942 but growing conditions over the state were so favorable that very little noticeable injury was done. They were scored at 1 to 3 by reporters in most counties and a final summary of 2 was generally recorded. White grubs were reported as fairly injurious around Kingman.

Wireworms were slightly more numerous and destructive in certain areas in 1942 than during last year. The summary scores are mostly 2's and 3's with a few 4's. They were especially noticeable in the counties around Riley, in the northeastern counties and south central counties. Some wireworm damage to muskmelon seeds occurred during May in Riley county. Reports of wireworm injury in northwest Kansas probably referred to false wire worms instead.

Summary and Conclusions

The year 1942 was nearly normal as to temperature and with the exception of 1915, it was the wettest in Kansas since weather records were started in 1887. June was the wettest June in 13 years, September the fourth wettest and October by far the wettest tenth month. Pittsburg had 63.11 inches during the year, one of the largest annual totals ever recorded in Kansas. The smallest total was 24.17 inches at Leoti which was 50 percent above normal. Although

a fine crop year it was the worst the state has had for floods. The spring was cool, wet and late and the summer was mild, the early fall was wet and had about normal sunshine but there was an excess of cloudiness for the last two months.

Crop production in Kansas in 1942 was the second largest on record, being exceeded only in the year 1931. Although the acreage in crops was decreased about 1.4 percent this year the 1942 production was 21 percent higher than last year and was about 74 percent above the 5 year (1936-40) average. The outstanding high yields of 1942 were made possible by a combination of unusually favorable weather and war-time demand that called for maximum effort and insured a market for practically everything that farmers could produce. Growing conditions were unusually favorable throughout the state. Crops and ranges were benefitted by the subsoil moisture remaining from the exceptionally heavy rainfall of 1941 and were helped along by the above normal rainfall of 1942. The wheat crop was second only to 1931, the largest corn crop since 1932, a hay crop larger than in any year since 1928, flax production the largest since 1891 and a soybean crop more than 4 times the production in any previous season.

The following insects occurred in **outbreak numbers** during 1942 in Kansas: canker worms; red cedar scales; stable flies; Hessian fly; mosquitoes; southwestern corn borer; garden webworms.

The following insects, ticks and mites were **more numerous in 1942 than in 1941**; army worms; green bugs; corn leaf aphid; aphids on tulips and roses; bag worms; bot flies; codling moths; striped cucumber beetles; inported cabbage worm; cattle grubs; house flies; stable flies; horn flies; screwworm flies; fleas on pets and in homes; stored grain insects; garden webworms; hessian flies; lice on domestic animals; mosquitoes; southern corn root worm; root worm beetles; tomato horn worm; wheat straw worms; wheat stem maggots; wireworms;

The following insects, ticks and mites were approximately **as plentiful in 1942 as in 1941**; ants; pea aphids; boxelder bugs; chinch bugs; chiggers; harlequin cabbage bugs; strawberry sawfly; white grubs.

The following insects, ticks and mites were **less plentiful in 1942 than in 1941**: wheat-head army worm; corn ear worm; elm leaf aphid, cucumber and melon aphids; blister beetles; tree borers; crickets; cutworms; Colorado potato beetles; fall army worms; grasshoppers; green striped maple worms; rose sawflies; strawberry leafrollers; red cedar scale; termites in homes and about living plants and false wireworms.

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CONTENTS OF THIS NUMBER

A Contribution to the Taxonomy of the Genus Orgerius in America, North of Mexico (Fulgoridae, Homoptera). Kathleen C. Doering and Herbert H. Darby 73
(concluded from April issue)

The Twelfth or 1942 Annual Insect Population Summary of Kansas. Roger C. Smith and E. G. Kelly 99

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